

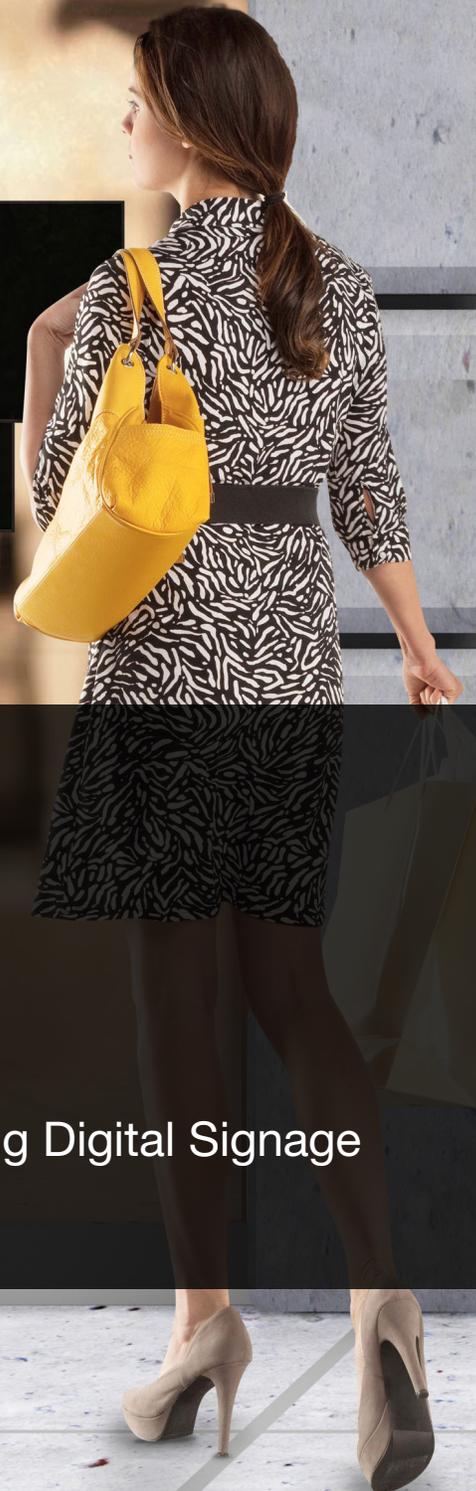
SAMSUNG



eBook:

The Digital Windowfront

Attracting Customers with Outdoor-Facing Digital Signage



Introduction

Screens in storefront windows have been used since the early days of television as a marketing tactic, but it's rarely worked well because of a very big, bright problem – the sun.

The latest generation of commercial digital signage displays are finally solving that problem – with displays

bright enough to overpower the blinding, washed-out glare of direct sunlight.

Engineering advances have also overcome the other big obstacles to using digital displays in shop fronts and lobby windows – managing the build-up of heat from sitting in direct sun for

hours, high capital costs, heavy energy consumption and shaky reliability.

This white paper looks at the two primary display technologies – high brightness LCDs and direct view LEDs – that are making the future bright for bringing powerful visual messaging to sidewalks and streets, day or night.

Unique Challenges of Outdoor Digital Signs

Shopkeepers and building operators have always put signs and posters in windows, because a message at the doorstep to a business can pull foot traffic inside. Visuals down at eye-level – both for people and motorists – also have a much better chance to be seen and remembered than messages placed 40 feet up on a billboard.

Putting digital screens on a sidewalk or outside a building introduces a lot of extra cost and complexity – from getting power to the unit, to weatherproofing and vandal resistance. There are also arcane matters like applying for and winning local zoning approvals, which can take a lot of time, paperwork and lawyers.

Putting screens inside windows – weather-protected, secure and often free of city hall's rules and regulations – is far easier, as well as far less costly.

But it's only lately that technology has caught up to the demands, and made the tactic feasible.

The most obvious way to compete with the midday sun is to make the screen extra-bright. Typical LCD flat panel monitors generate 350 nits (nits being a measure of brightness), but adding extra backlighting can greatly amplify brightness readings.

Early versions of these high-bright displays - designed to be what's called "daylight/sunlight readable" – required a lot of extra energy to drive both the backlighting and the fans needed to counteract the excessive heat generated by those added lights, and hours of direct sunlight. All that heat inevitably caused reliability problems, degraded the LCDs and shortened the operating lifespan of typical units.

The result: high-bright LCDs did the job, but were big and bulky by necessity, very expensive, and would last only a year or two in the field before image quality or reliability necessitated a replacement.

Manufacturers have also tried measures such as reflective films and bonding of the display glass to counteract daylight

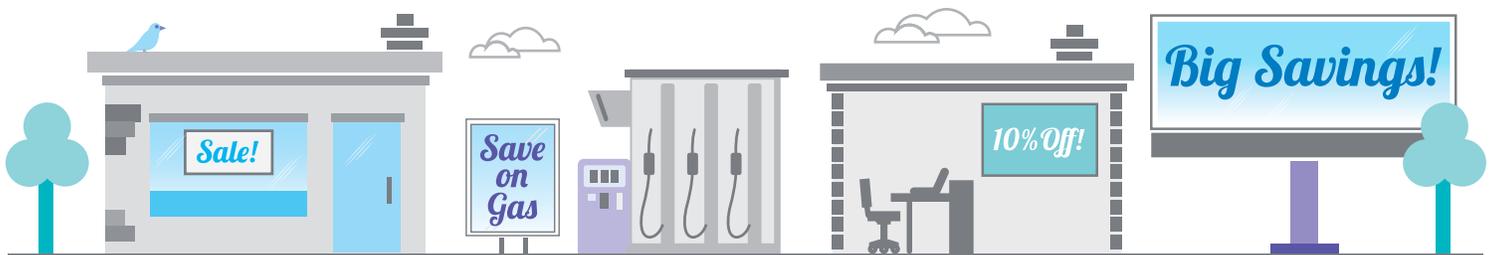
glare. But those technologies also introduced extra cost, complication, or in the case of reflective films, visual performance that varied dramatically between sunny and cloudy days.

Samsung now has an outdoor-optimized product – the OH Series – that successfully deals with all these challenges, but there are still extra costs and challenges – like electrical labor and local approvals – that no technology can overcome.

Learn more about high-brightness LED and LCD displays



samsung.com/b2bdigitalsignage



One In-Window Challenge, Two Options

There are two solid, cost-effective options on the market that leverage years of in-the-field experience and technology advances to present two solid outdoor-facing options for marketers: a new breed of daylight-readable LCD panels, and direct-view indoor LED displays.

Daylight-readable LCD:

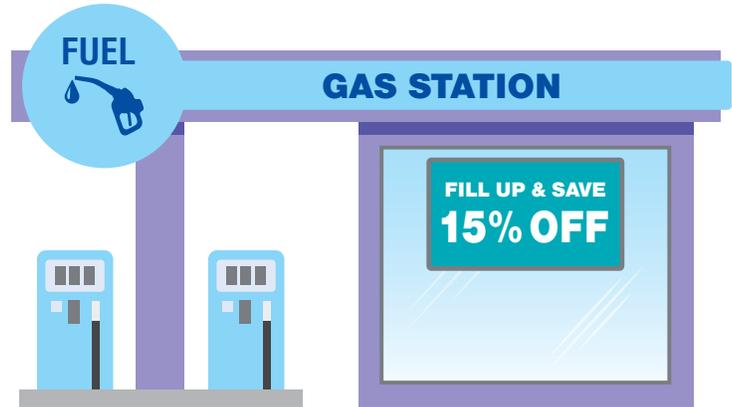
LED backlighting strips have replaced cold cathode fluorescent lamps (think of skinny fluorescent light tubes) as the illuminating power behind most LCD panels today, including super-bright LCDs designed for shop windows and applications like outdoor drive-thru pre-sell and order screens.

The conventional wisdom is that a display needs to have a brightness rating of at least 1,000 nits to offer useful viewability in direct sunlight. Samsung's new line of semi-outdoor OM Series high brightness displays for business push out 2,500 nits, easily cutting through even direct, mid-afternoon sunlight.

Direct View LED:

Most consumers will be familiar with the huge LED screens they see at stadiums, looming over the stands, or LED billboards lighting up along the sides of busy roadways.

That technology can look bright and beautiful from a distance, but as viewers get closer the visuals start to degrade, because viewers begin to see the individual LED lights that make up these huge digital canvases.



The units only need small, library-quiet fans and minimal rear clearance for ventilation, and have built-in smarts to adjust the lighting power of the display based on ambient conditions, dialling back brightness and saving energy usage on cloudy days and each evening and overnight.

Engineers also use circular polarizing technology on the displays, which ensures the polarized lenses of sunglasses that many people wear on bright days do not distort what people see on the screens.

But technology advances have changed the game, greatly narrowing the gaps between LEDs to a point that from just a matter of 20 feet away, a direct-view LED starts to rival the clarity and crispness of LCD panels.

The technology is called direct-view because LEDs are also used as the lighting sources for other display technologies, like LCD. But in those cases, viewers are seeing other display

technology that's illuminated by hidden LEDs. With these newer indoor-based LEDs, viewers are looking directly at the LEDs.

While stadiums and highway billboards typically have pixel pitches – the gaps between LEDs – of 10-20 mm, direct-view indoor LEDs have pixel pitches as tight as 1 mm, meaning the visuals look tight and crisp to shoppers walking by a sidewalk window, and certainly to passing motorists.

With Direct View LED visuals look tight and crisp to shoppers walking by a sidewalk window, and certainly to passing motorists.

How They Fit

Digital displays are being used in windows to attract attention, and then do everything from simple branding to very overt calls to actions.

In the Maverik convenience store chain, operating in the western United States, Samsung semi-outdoor LCD screens are placed above the inside entry area, pointed at motorists topping up their gas tanks at the pumps. The chain runs messaging aimed at enticing people inside to buy snacks and other high-margin items.

Outdoor-facing screens are taking the place of printed posters that retailers have traditionally put in windows, to drive awareness, interest and foot traffic for new products and promotions. With ultra-slim depths made possible by LED-based backlighting, these displays are not much thicker than poster frames – but enable retailers to change prices and promotions rapidly, instead of waiting days or weeks for new printed material.

Many fashion retailers use semi-outdoor displays, often stacked or grouped vertically, to create some street-side visual excitement by running fashion show runway videos or custom-produced content aimed at reinforce their all-important brand and consumer affinity.

Banks, in particular, are using video walls built from semi-outdoor displays to bring key messaging – from versions of national advertising to tactical messages for a branch – to sidewalk windows, particularly downtown in large cities or areas with steady foot traffic.

Both LCDs and fine-pixel LEDs are starting to become part of the design of buildings. The millennial-focused Hollister retail chain has even made the full façade of stores an LCD video wall facing passing shoppers. Live-streaming a seashore camera feed from surf mecca Huntington Beach, CA.

Architects are using the free-form properties of LED display modules to build digital media columns and headers, and fill large street-level spaces like window displays with a digital canvas.



Outdoor-facing screens are taking the place of printed posters that retailers have traditional put in windows, to drive awareness, interest and foot traffic for new products and promotions.

The Right Display for the Job

So what's the right technology for a window job? A few factors come into play, including budget, scale, shape, clarity and lifespan.

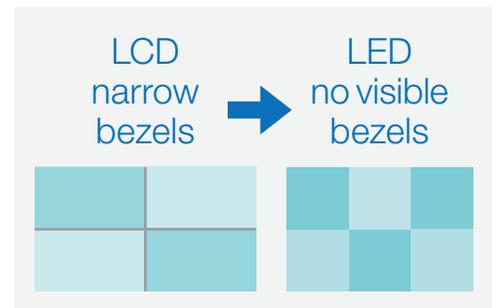
LCD technology is much more established, and produced in much higher volumes, so even a more specialized high-brightness solution will be less costly than direct-view LED displays. However, with almost all technologies, the cost gap will close over time.

Cost per square foot for a digital canvas becomes a greater factor based on the scale of the project. Is the goal to line the sidewalk windows of a building, for a full block, or just message in a specific area? Obviously, a very large project means the cost gap between the technologies will grow exponentially.

Using direct-view LED opens up possibilities for display canvases that are more than large rectangles and squares, as defined by groups of rectangular LCD panels. LED displays are modular and can be stacked in irregular patterns, stair-stepped and stretched as visual ribbons. They are also smaller and capable of being presented in gentle curves, instead of uniformly flat.

Direct-view LED modules join seamlessly, visually eliminating any grid marks evident when LCD displays are joined together to create video walls. However, the seams – known in the display business as bezels – are growing steadily thinner, and are also at a point that LCDs with narrow bezels are barely noticeable.

LCDs are going to be best when viewers will be viewing the content within just a few feet. LED displays have gaps between the individual pixels that are evident up close, but disappear as viewing distances increase.



That flexibility in shape means the canvas can fit the architecture, instead of just fitting as a square or rectangle within the building's window architecture.



Why the Window

There's nothing new here in terms of strategy – as long as there have been shops and businesses, there have been visuals of some sort outside the door and in the window, beckoning people to come inside.

The difference with digital is that it can be bigger, bolder, more eye-catching and relevant – even somewhat personalized.

Some digital displays being placed inside windows, facing out to customers, are doing the simple but impactful work of making people aware of special offers or new products and services that would compel them to come inside.

Combining digital displays with a sophisticated content management platform and data from systems – from point of sale to customer relationship and loyalty management platforms – opens up the possibility of scheduling and display content based on a variety of data attributes and conditions.

A restaurant chain, for example, could have a system that automatically monitors traffic, mass transit and weather conditions which could display messages in windows that suggest people wait out a subway disruption or passing rainstorm by having a drink and early dinner inside. When everything is fine, it could be messaging how it's a beautiful day for a lazy lunch on the eatery's patio.



The difference with digital is that it can be bigger, bolder, more eye-catching and relevant – even somewhat personalized.

Outdoor Signage Adoption

Samsung did a revealing online survey with IT professionals on the business networking site Spiceworks. Results from the January 2016 survey showed there is a lot of room for growth on outdoor-facing messaging.

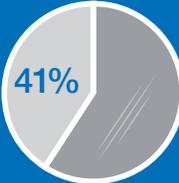
 **85%** of IT pros were using or planning to use indoor LCDs for signage projects.

 **Only 33%** were using or planning to use outdoor LCD.

 The number dropped to **28%** for direct-view LED.

41% of responding IT pros believe digital signage is being underutilized in their businesses.

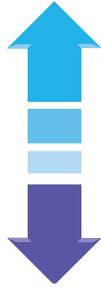
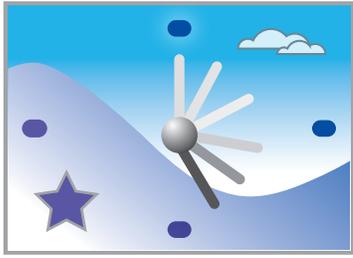
digital signage underutilized




57% of respondents didn't know enough about direct-view LED, or understand their business case and value.



Putting This Into Practice



Samsung's built-in brightness sensor technology to automatically adjust the brightness levels to match the ambient light conditions outside.

The Maverik convenience store chain, which has some 270 locations across more than 10 states, uses digital signage displays to market to draw people into their stores, and again once they're in.

“The way Maverick gets people in the door is by creating an experience that they can't get anywhere else, says Ernie Harker, Maverik's Director of Marketing. “It's very challenging to get someone's attention using a static sign, so we started looking at motion graphics and video displays, to be able to convey who Maverik is. Not just to sell an item, but convey a different connection with customers.”

The chain has screens facing out to the fuel pump forecourt area, running a tight

loop of promotions aimed at drawing motorists inside, even when they are just paying at the pump.

The LCD screens, fixed in entryway windows, use Samsung's built-in brightness sensor technology to automatically adjust the brightness levels to match the ambient light conditions outside – turning it up on bright blue afternoons and dialing it back come evening. That saves on energy usage, but also extends the operating life of displays.

Maverick also uses Samsung Smart Signage displays around the interior of its stores to drive high-margin convenience purchases, such as soft drinks and snacks.

Conclusion: A Bright Future

The digital display business is in the midst of a big wave of innovation – with new display technologies like electronic paper and OLED on the rise, and steady advances in the use of LEDs for both LCD lighting and direct viewing.

Engineering advances are allowing for better brightness, higher resolutions, more flexibility and smaller footprints for the displays. Big and blocky is being replaced by slim and sleek with many displays.

There will be fewer constraints about where displays can go and how they can be used, and the rise of data-driven messaging – powered by the Internet of Things – means the messages that marketers push out can be tailored more and more to the interests of the audience at that place and moment.

There will always be paper posters in some shop windows, but more and more, what we see as we walk or drive by storefronts and building lobbies will be big, vivid and digital.



Learn more: samsung.com/b2bdigitalsignage | insights.samsung.com | 1-866-SAM4BIZ

Follow us:  youtube.com/samsungbizusa |  [@SamsungBizUSA](https://twitter.com/SamsungBizUSA)

SAMSUNG